

CLAIMS

What is claimed is:

1 1. A photodiode comprising:
2 a silicon substrate of a first conductivity type having
3 first and second surfaces;
4 a region of a second conductivity type on the first
5 surface of the substrate;
6 a region of a first conductivity type on the second
7 surface of the substrate, the region of a first conductivity
8 type on the second surface of the substrate having a higher
9 conductivity than the substrate;
10 a patterned isolation layer on the region of a first
11 conductivity type on the second surface of the substrate;
12 and,
13 a metal layer on the patterned isolation layer and
14 contacting the region of a first conductivity type on the
15 second surface of the substrate between regions of the
16 patterned isolation layer.

1 2. The photodiode of claim 1 wherein pattern of the
2 patterned isolation layer is a repetitive pattern.

1 3. The photodiode of claim 2 wherein the isolation
2 layer is an oxide layer.

1 4. The photodiode of claim 2 wherein the isolation
2 layer is a nitride layer.

1 5. The photodiode of claim 2 wherein the pattern is a
2 repetitive pattern of rectangular regions.

1 6. The photodiode of claim 1 wherein the substrate is
2 an n-type substrate.

1 7. The photodiode of claim 1 wherein the substrate is
2 an p-type substrate.

1 8. The photodiode of claim 1 further comprised of an
2 oxide layer over the region of a second conductivity type and
3 surrounding substrate, and a patterned metal layer over the
4 oxide layer and making electrical contact with the region of
5 a second conductivity type through an opening in the oxide
6 layer.

1 9. A method of forming a photodiode comprising:
2 providing a silicon substrate of a first conductivity
3 type having first and second surfaces;
4 doping the second surface of the substrate to provide a
5 layer of the first conductivity type of higher conductivity
6 than the substrate and providing a layer of oxide thereover;

7 doping the first surface of the substrate to provide a
8 layer of the second conductivity type and providing a layer
9 of oxide thereover;

10 masking and etching the oxide layers on the first and
11 second surfaces of the substrate to expose a contact region
12 to the layer of the second conductivity type and to pattern
13 the oxide layer on the second surface to expose a
14 complementary pattern of the layer of the first conductivity
15 type of higher conductivity than the substrate; and,

16 providing a layer of metal on the second surface of the
17 substrate and a patterned layer of metal on the first surface
18 of the substrate.